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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/929,280	08/13/2001	David J. Edlund	NPW 318	8195
23581	7590	11/02/2004	EXAMINER	
KOLISCH HARTWELL, P.C. 520 S.W. YAMHILL STREET SUITE 200 PORTLAND, OR 97204			CREPEAU, JONATHAN	
			ART UNIT	PAPER NUMBER
			1746	

DATE MAILED: 11/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/929,280

Applicant(s)

EDLUND ET AL.

Examiner

Jonathan S. Crepeau

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 16 August 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-21, 23-44 and 47-58 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21, 23-44 and 47-58 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

1. This Office action addresses claims 1-21, 23-44, 47-53, and newly added claims 54-58. The claims are all newly rejected as necessitated by amendment. Accordingly, this action is made final.

### ***Claim Rejections - 35 USC § 102***

2. Claims 1-3, 5, 7, 9-12, 15-17, 19-21, 23, 24, 25, 32, 33, 48, and 54-57 are rejected under 35 U.S.C. 102(b) as being anticipated by Ohsaki et al (U.S. Patent 4,988,580). Regarding claim 1, the reference teaches a fuel processor (7), a hydrogen storage tank (27), a mechanical compressor (25) between the processor and the storage device, and a fuel cell stack (21) (see Fig. 1). The fuel cell stack is adapted to simultaneously receive hydrogen from the storage device and the fuel processor. Regarding claims 2 and 3, the compressed stream and the pre-compressed stream have the same composition. Regarding claims 11, 12, 15, and 16, the system comprises a purification region (i.e, PSA system or a membrane) that purifies and separates the hydrogen (see col. 4, line 5). Regarding claim 9, a valve regulates the pressure of the hydrogen supplied to the tank (see Fig. 1). Regarding claims 17 and 20, the hydrogen is produced by steam reforming or partial oxidation (see col. 5, line 20 et seq.). Regarding claim 20, the fuel processor comprises an electrolyzer (52). Regarding claims 21 and 23, the system comprises a

controller for controlling the amount of hydrogen delivered to the hydrogen supply and fuel cell (see abstract; col. 6, lines 62-64). Regarding claims 24, and 25, the hydrogen is regulated in response to the applied load (see col. 6, line 62).

Thus, the instant claims are anticipated.

### ***Claim Rejections - 35 USC § 103***

3. Claims 6, 8, 13, 14, 26-28, 30, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohsaki.

The reference is applied to claims 1-3, 5, 7, 9-12, 15-17, 19-21, 23, 24, 25, 32, 33, 48, and 54-57 for the reasons stated above.

However, the reference does not expressly teach that the components are integrated in a common housing (claims 6 and 8), or that the hydrogen separation membrane is made of palladium (claims 13 and 14). The reference further does not expressly teach that the hydrogen delivery is controlled responsive to the hydrogen pressure or flowrate, or the quantity of hydrogen in the storage device (claims 26-28, 30, and 31).

However, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use palladium as the material of the hydrogen separation membrane. Palladium is well-known for use in such membranes, and the selection of a known material based on its suitability for its intended use has generally been held to be *prima facie* obvious (MPEP §2144.07).

Regarding claims 6 and 8, these claims are also not considered to be distinguished over Ohsaki. The claims merely recite that the components are fully or partially integrated in a common housing. However, it has been held that making integral or portable is generally not considered to impart a patentable distinction. See MPEP §2144.04.

Regarding claims 26-28, 30, and 31, the reference fairly suggests these limitations. In column 6, line 6 et seq. and in column 6, line 64, the reference teaches that the pressure, flow rate, and amount of stored hydrogen are regulated in the operation of the fuel cell. As these values are important in the operation of the system, it would be obvious to measure these values and incorporate them into the control scheme to obtain an even more precise control of the system. As such, claims 26-28, 30, and 31 would also be rendered obvious.

4. Claims 4, 47, and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohsaki in view of Bloomfield (U.S. Patent 5,900,031).

Ohsaki is applied to claims 1-3, 5, 7, 9-12, 15-17, 19-21, 23, 24, 25, 32, 33, 48, and 54-57 for the reasons stated above.

However, the reference does not expressly teach the presence of an electrochemical compressor, as recited in claims 4, 47, and 58.

Bloomfield is directed to hydrogen production system comprising an autothermal reformer and an electrochemical compressor (see abstract).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the electrochemical compressor of Bloomfield in the system of Ohsaki. As would be appreciated by the artisan, electrochemical compressors produce high-pressure hydrogen in an efficient and reliable manner (e.g., since there are no moving parts). As such, the artisan would be motivated to use the electrochemical compressor of Bloomfield in the system of Ohsaki.

5. Claims 34-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohsaki in view of Colborn (U.S. Patent 6,522,955).

Ohsaki is applied to claims 1-3, 5, 7, 9-12, 15-17, 19-21, 23, 24, 25, 32, 33, 48, and 54-57 for the reasons stated above.

However, the reference does not expressly teach that the controller is "computerized" (claims 37 and 38) or comprises a wired or wireless communication linkage (claims 34-36). The reference further does not expressly teach that the controller comprises a memory (claim 39), or that the controller comprises an interface capable of having a user input (claims 40-44).

Colborn is directed to a system and method for power management. The system comprises a communication device (i.e., controller) (102). The device comprises a display (600), user input (404), memory (608) and a wired or wireless linkage (see col. 8, lines 37-49; col. 10, line 7 et seq.).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the control device of Colborn in the system of Ohsaki. In column 4, line 10, Colborn teaches that it is an object of the invention is "to provide a power management system that is compact, efficient, and easy to use." As such, the artisan would be motivated to use the control device of Colborn in the system of Ohsaki.

6. Claims 49-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohsaki in view of Skoczylas et al (U.S. Patent 6,666,961).

Ohsaki is applied to claims 1-3, 5, 7, 9-12, 15-17, 19-21, 23, 24, 25, 32, 33, 48, and 54-57 for the reasons stated above.

However, the reference does not expressly teach that the hydrogen storage device comprises a metal hydride or carbon nanotube bed, as recited in claims 49-53.

Skoczylas et al. is directed to an electrochemical cell. In column 8, line 52, the reference teaches that "[t]he hydrogen produced hereby can be stored as high-pressure gas, or alternatively, in a solid form, such as a metal hydride, a carbon based storage (e.g. particulates, nanofibers, nanotubes, or the like)."

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the disclosure of Skoczylas et al. indicates

that metal hydrides and carbon nanotubes are functionally equivalent to high-pressure gas tanks for storing hydrogen. As such, it would be obvious to substitute the metal hydride or carbon nanotubes of Skoczylas et al. for the tank of Ohsaki. An express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982); MPEP §2144.06.

7. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohsaki view of Wojtowicz et al (U.S. Pre-Grant Publication No. 2002/0041986).

Ohsaki is applied to claims 1-3, 5, 7, 9-12, 15-17, 19-21, 23, 24, 25, 32, 33, 48, and 54-57 for the reasons stated above. However, the reference does not expressly teach that the hydrogen is produced via pyrolysis.

Wojtowicz et al is directed to a method of producing hydrogen comprising the steps of pyrolysis and steam reforming (see Fig. 1).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the pyrolysis/steam reforming method of Wojtowicz et al. in the system of Ohsaki. Wojtowicz et al teaches the following in paragraph 20:

[0020] It is also an object of the invention to provide a power system wherein hydrogen gas for use in a fuel cell is produced from a hydrocarbonaceous material, and wherein the system may be self-contained and implemented in a transport vehicle.



Therefore, the artisan would be motivated to use the pyrolysis/steam reforming method of Wojtowicz et al. in the system of Ohsaki.

8. Claims 27 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohsaki in view of Jones (U.S. Patent 6,686,078).

Ohsaki is applied to claims 1-3, 5, 7, 9-12, 15-17, 19-21, 23, 24, 25, 32, 33, 48, and 54-57 for the reasons stated above.

However, Ohsaki does not expressly teach that the measured operating parameters include the flowrate of hydrogen from the fuel processor (claim 27) or the “operating state” of the fuel processor (claim 29).

Jones is directed to a method of operating a reformer. The method employs sensors (64, 43) for detecting fuel flow to the reformer (e.g., an “operating state” of the reformer) and the flowrate of hydrogen from the reformer, and a regulator (45) for regulating hydrogen flow to the fuel cell (see Fig. 1).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the sensors of Jones in the system of Ohsaki. In column 1, line 58, Jones teaches the following:

Thus, there is a need for an efficient method and fuel cell system which inhibits the flooding of fuel cells particularly in periods of low electrical demand.

As such, the artisan would be sufficiently motivated to use the sensors of Jones in the system of Ohsaki.

### *Conclusion*

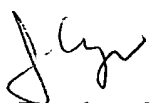
9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr, can be reached at (571) 272-1414. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jonathan Crepeau  
Primary Examiner  
Art Unit 1746  
October 28, 2004